Culinary Foundations I

Class 2: Introduction to Cooking; Taste & Flavor; Herbs & Spices; Smallwares ID; Sauté

Cooking

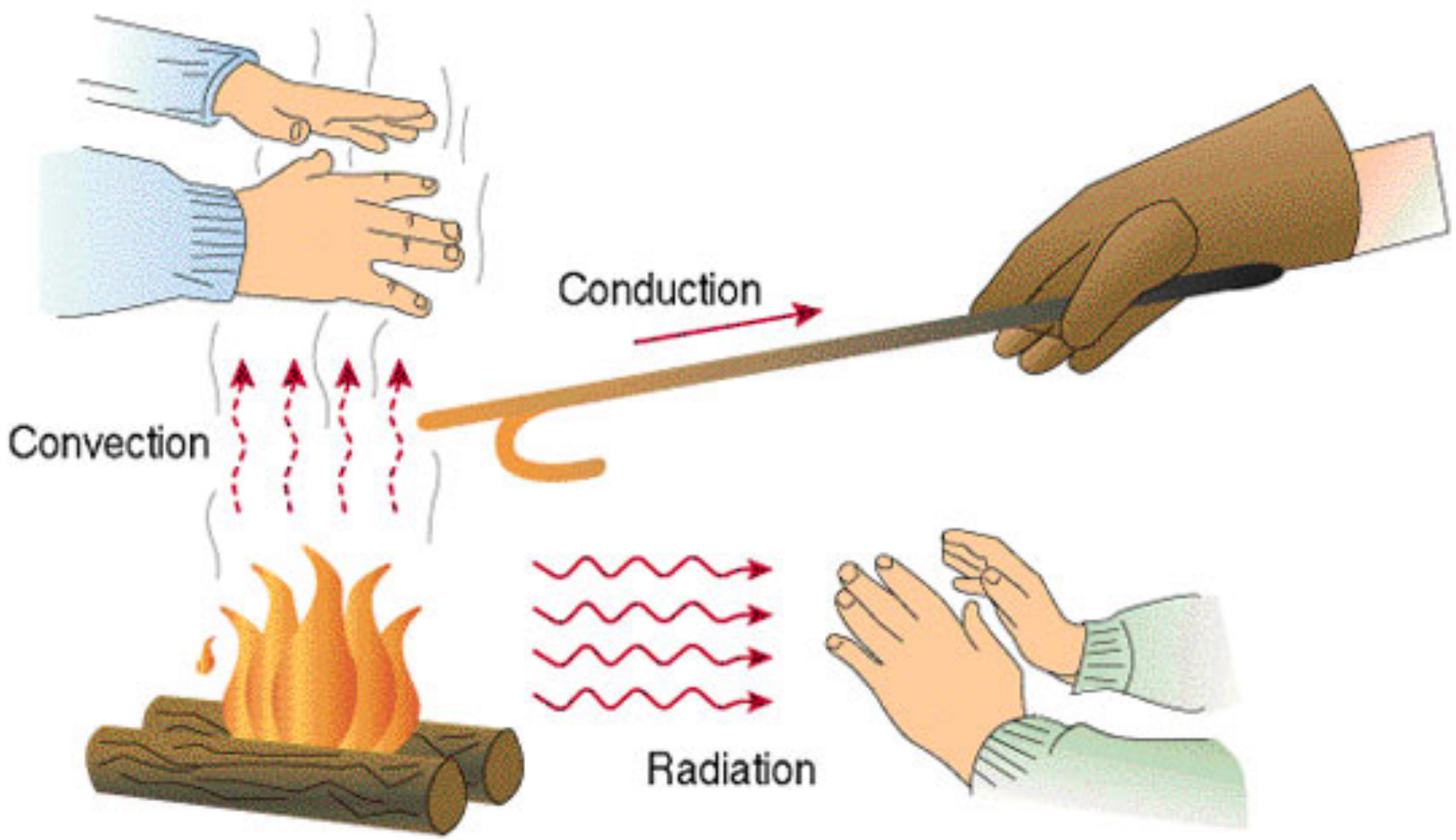
- *The preparation of food for consumption by the application of heat, changing the food's structure, texture, flavor, aroma and, or appearance.*

Objectives of Cooking

- Improve the Taste and Quality of Food
  - Raw onion or Cooked?
- Reduction of Pathogenic Organisms, Toxins
  - Salmonella
  - Bamboo Shoots, Cassava Roots, Mushrooms*(Only reduces toxins)
- Improves Digestibility
  - Potatoes, Rice, Grains, Legumes
- Increases Variety
  - Wheat can be made into breads, beer or eaten as a whole grain
- Increases the Consumption of Food
  - Softer foods, easier to eat
- Increases Availability of Some Nutrients
- Increase Antioxidant Value
  - Lycopene is released by cooked tomatoes
- Concentrates Nutrients
  - Removal of moisture and reduction in volume…think Spinach

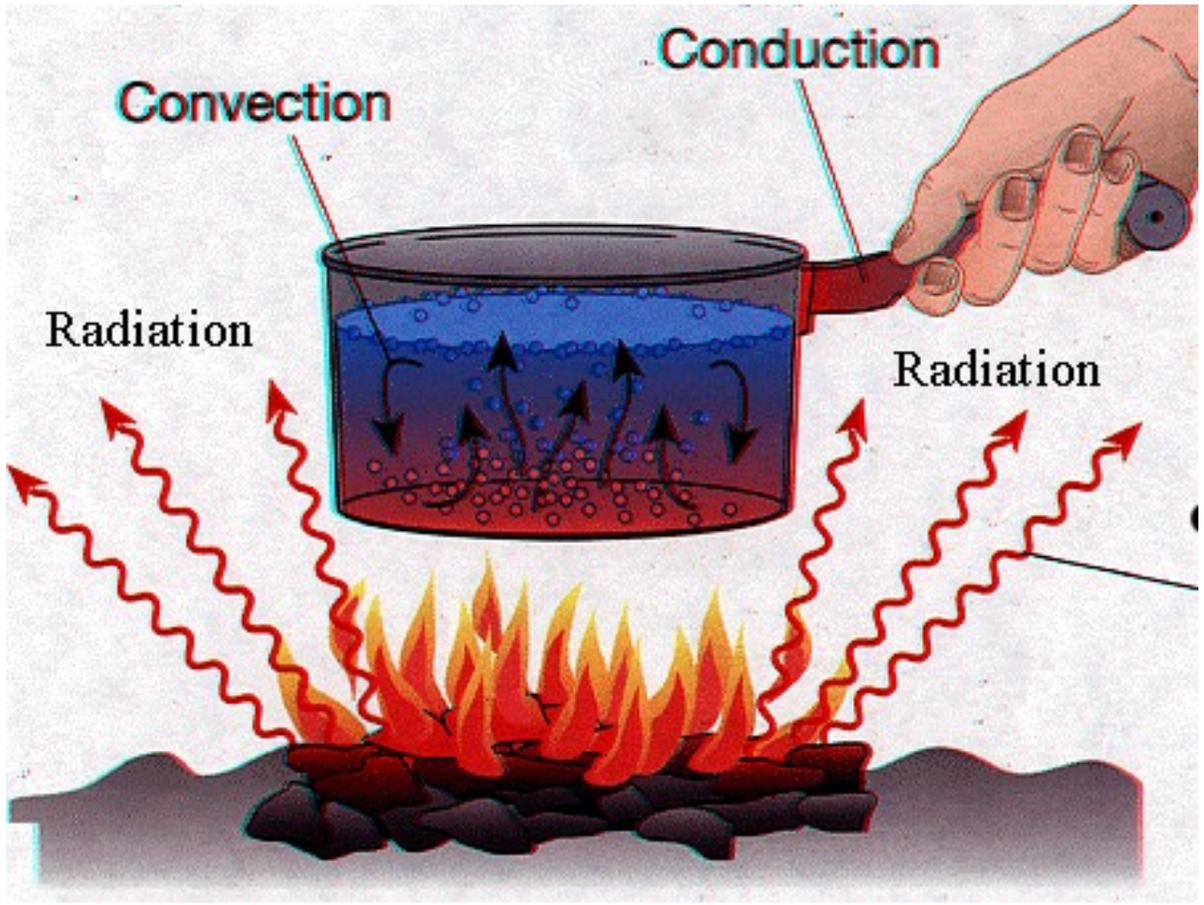
Types of Heat Transfer

- Conduction
- Convection
- Radiant



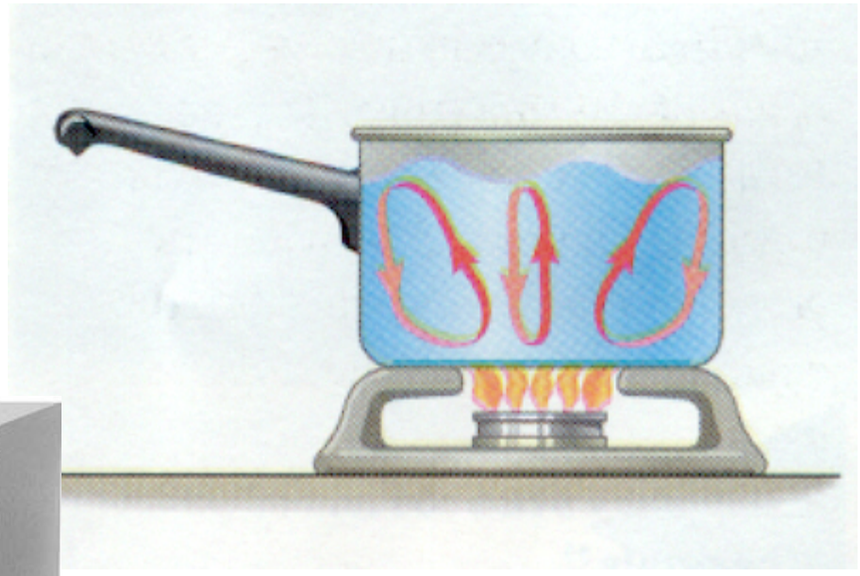
Conduction

- The Transfer of Heat by Direct Contact



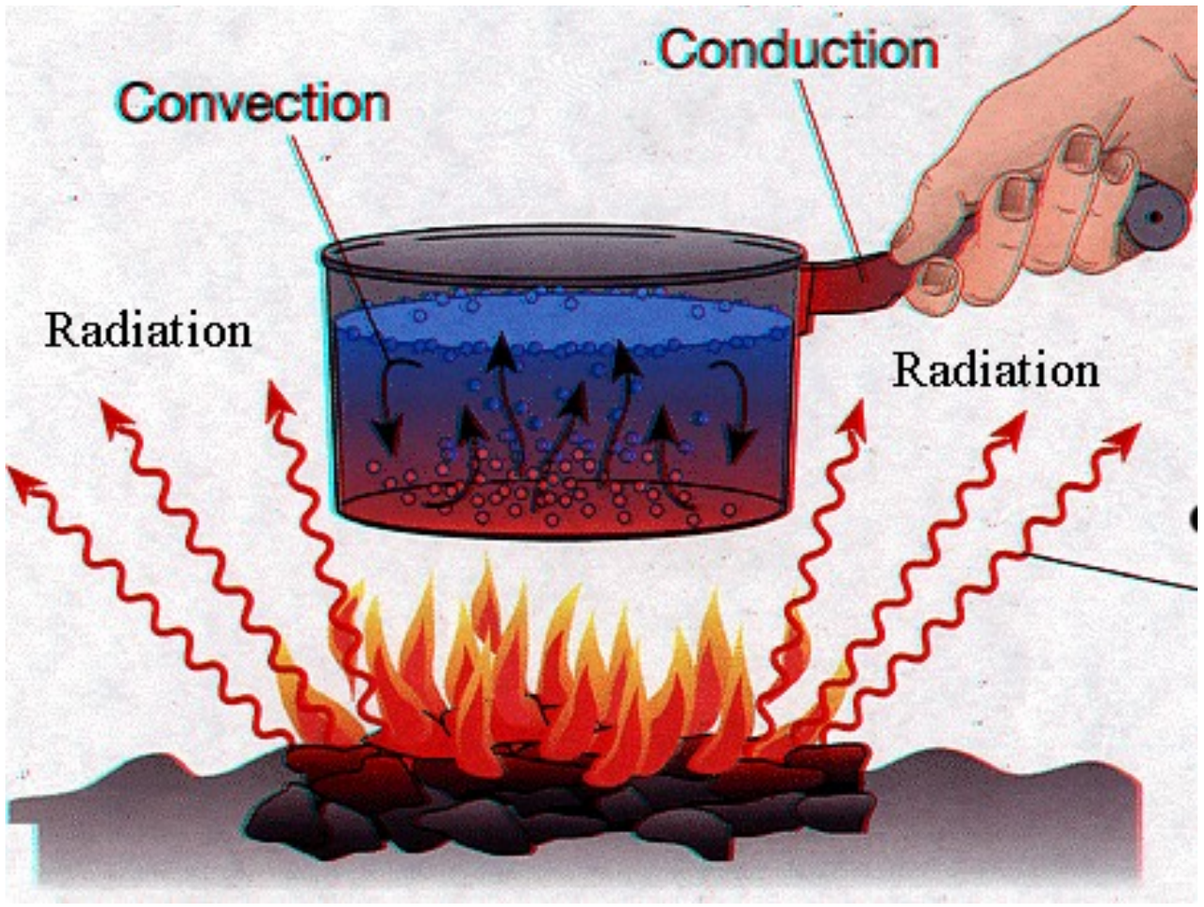
Convection

- The Transfer of Heat through a Fluid, i.e. Air, Liquid, or Fat.
  - Natural Convection
  - Mechanical Convention
    - Convection Ovens



Radiant

- The Transfer of Energy from Waves of Heat or Light.



Does 350°F always = 350°F ?

Consider…

An oven heated to 350°F, is the metal rack the same temperature as the air?

Can you put your bare hand in the oven safely? Can you touch the metal rack with your bare hand safely?

What's the difference? (See Next Slide)

Heat or Thermal Capacity

- The relative amount of energy required to heat a substance.
- Liquid water has virtually highest heat capacity
  - Steam has ½ the heat capacity of liquid water
  - Oil has ½ the heat capacity of liquid water
  - Air has ¼ the heat capacity liquid water

The Effects of Heat on Food

- Proteins
  - Coagulate between 100˚F and 140˚F
    - Protein strands unfold and stick to each other trapping water…meat firms and liquid eggs solidify
  - Coagulated proteins dry out when cooked hotter than their coagulation point…drying meat out and making eggs rubbery
  - Acids can cause proteins to coagulate or "curdle"
  - Some proteins produce enzymes that effect texture
    - Cooking inactivates enzymes
  - Gelatin in an exceptional protein
    - That forms a gel at low temperatures and melts at higher

The Effects of Heat on Food, con't

- Fats – Melt or *Render*
- Carbohydrates
  - Sugars – Caramelize
  - Starches – Gelatinize
- Water Evaporates

Browning *(Non-Enzymatic)* & Carmelization

- *The browning that occurs on foods, usually in the presence of heat, that results in the formation of new flavor compounds.*
- White Bread vs. Toast
- Caramelized Fruit
- Seared Proteins
- Building a "Fond"

The Maillard Reaction

- One of the most important flavor-producing reactions
- More than just browning, it is an intense flavor reaction
  - Browning in the presence of amino acids (proteins)

***Food Nerd Alert:**
Just 2 grams of one (of many) of these flavor compounds (bis-2-methyl-3-furyl-disulfide) dissolved in a lake 6’ deep and 5 miles wide would have a noticeably “beefy” taste!!!

- Grill marks have intense Maillard reactivity, the space between has less.
- Acids (think marinade) inhibit browning
- Sugars drive the reaction (think Peking Duck)

MAILLARD REACTION

reshuffling atoms, over heat, to make flavor molecules

PROCESS

70°F/21°C 212°F/100°C 250°F/110°C → 300°F/149°C 330°F/166°C 400°F/204°C

flavor-full
(Maillard Reaction/browned)

raw (uncooked)

bland (steamed)

sweet (caramelized)

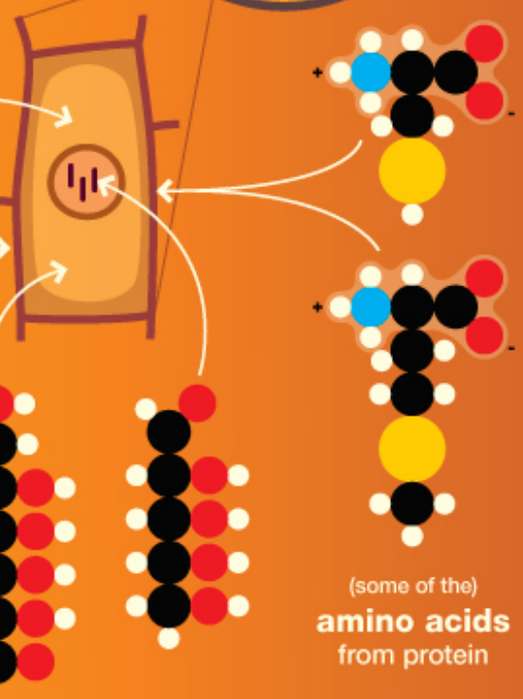
no taste (burned)

More + more-varied proteins (meat vs. veggies) = more (stronger) flavors.

Only the surface reaches the temperature at which the Maillard Reaction (discovered by chemist Louis Camille Maillard in the 1910s) can occur.

browned onions
(Maillard Reaction happens before caramelization)

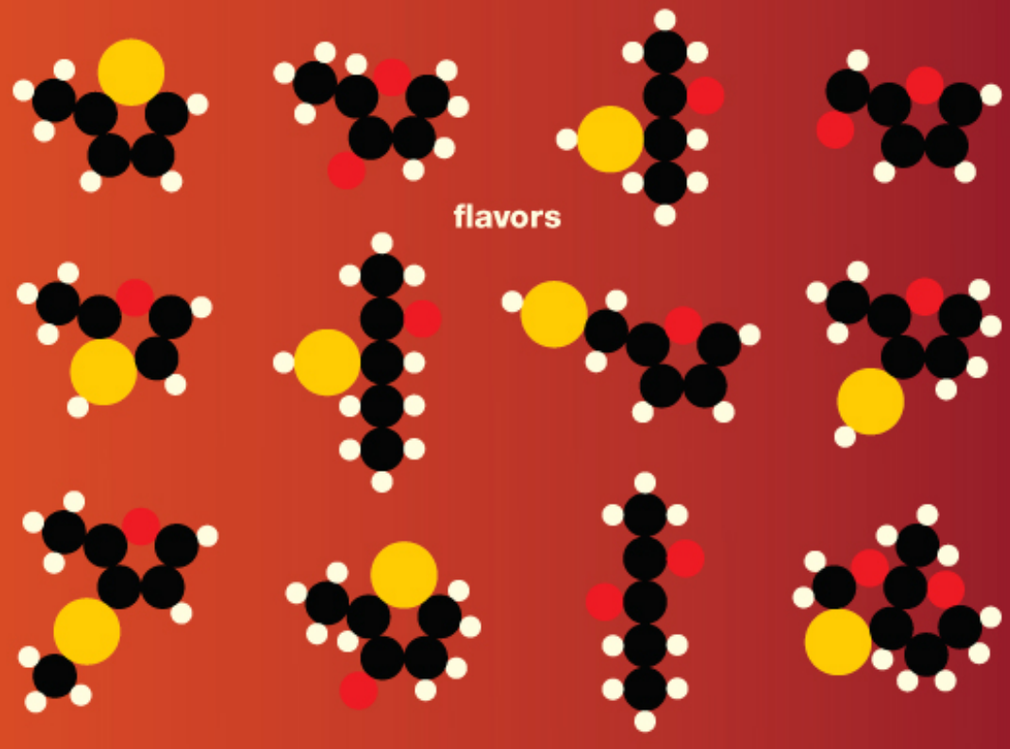
water



sugars

(some of the) **amino acids** from protein

+heat



flavors

H O N C Sulfur

Heat and water causes hydrolysis or the breaking of the peptide bonds [in protein]. Enzymes in your body perform this at lower temperatures and more efficiently.
-Michael Klopfer

IOANA Science Mentors: Michael Klopfer, Kevin Mirabile, Julia Stewart, & Carolyn Tripoli

3 Classifications of Cooking *Methods*

1. Dry
   - Use of Air or Fat as Cooking Medium
2. Moist
   - Use of Steam or Water as Cooking Medium
3. Combination
   - Use of Both Dry and Wet Methods in Combination

The Dry Methods

- (No Added Oil)
  - Broiling
  - Grilling
    - Griddling
    - Pan-Grilling
  - Roasting
  - Baking
- (Added Oil)
  - Sautéing
  - Pan or Shallow Frying
  - Deep Frying

The Moist Methods

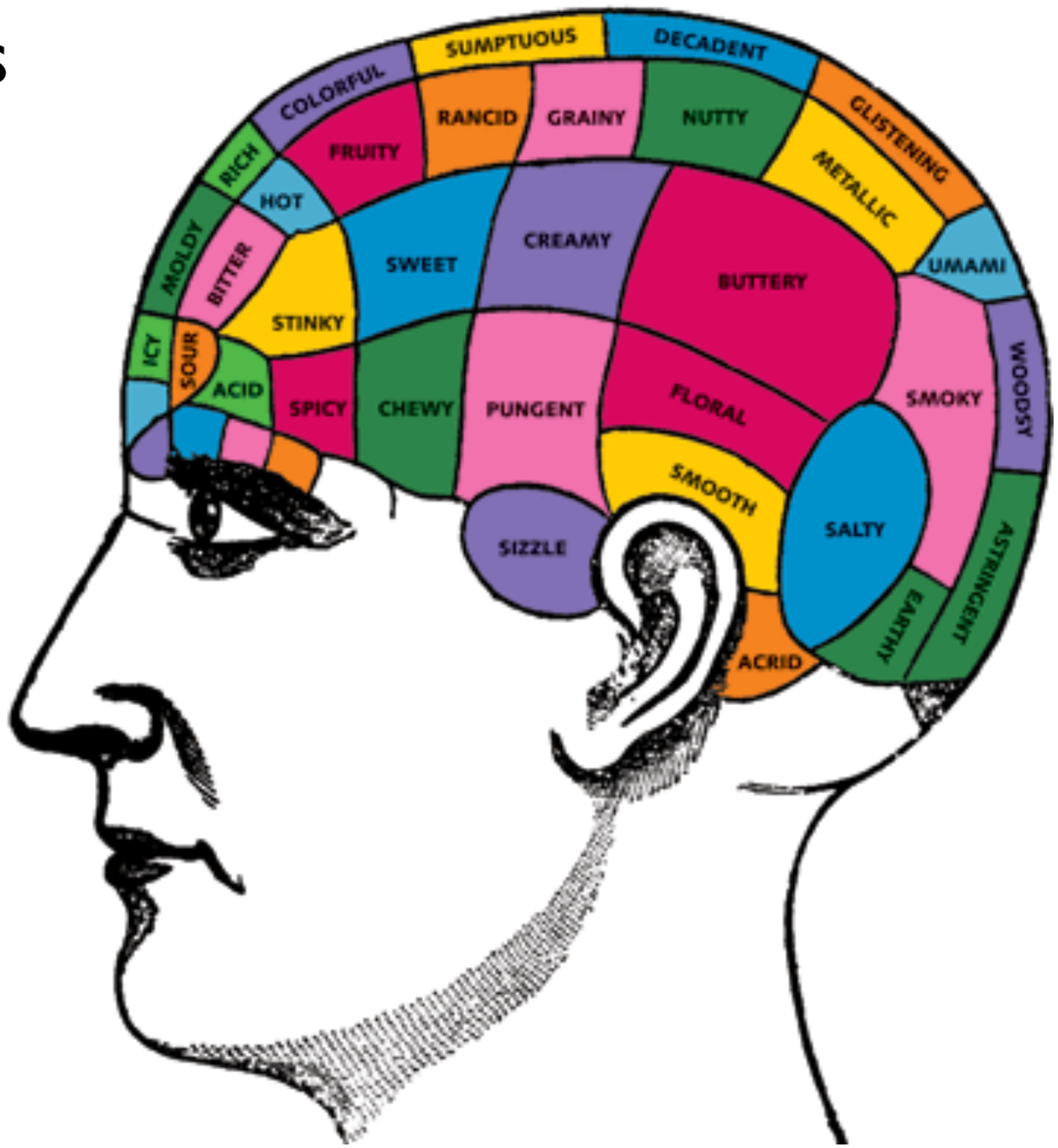
- Poaching (*á la nage*)
- Blanch
- Simmering
- Boiling
- Steaming

The Combination Methods

- Braising
- Stewing
- Poêléing
  - For tender cuts of meat or poultry, food cooked in a covered pot; maybe browned in fat first.

Flavor

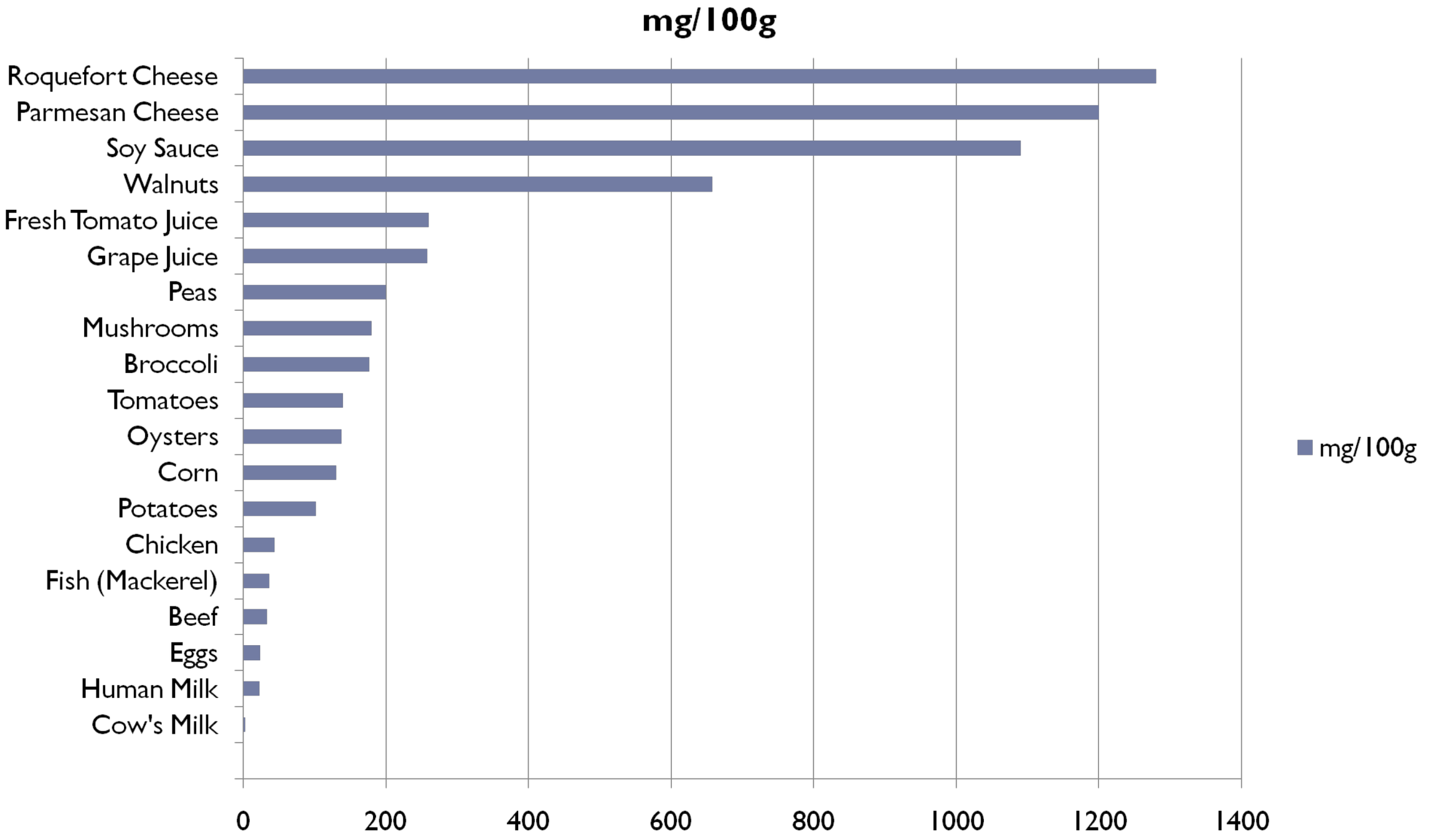
- A quality of a food or drink as perceived by the senses of taste, touch and smell
- Influenced by our own genetics, awareness, experience, and surroundings.



Taste

- Sensory (gustatory nerves) input from taste buds to brain
  - Sweet
  - Sour
  - Salty
  - Bitter
  - Umami
    - Taste imparted by glutamate-rich (also inosinate & guanylate) foods
    - Japanese for “delicious” “mouthwatering” “pleasant aftertaste”
    - Richness of Meats, Cheeses, Stocks & MSG
    - Also Soy Sauce, Mushrooms & Fermented Foods…and Human Breast Milk

Umami-Rich Foods



Aroma

- Sensory (olfactory nerves) input from receptors in nose to brain
- The average person can discriminate between 4,000 to 10,000 different odor molecules! *(But can we describe them???)*

Mouthfeel

- Sense of touch inside mouth

Palate

- A person's ability to recognize and appreciate a range of flavors
- A Chef's Most Important Tool

Factors Affecting Perception of Flavors

- Temperature – *Season hot food when hot, cold food when cold.*
- Consistency – ex. Cream, whipped and un-whipped
- Presence of Contrasting Tastes – sugar to coffee, lemon to fish, etc
- Presence of Fats
  - Can transmit flavors
  - Can coat tongue
- Color
  - Think green vs. red ketchup

Describing Flavors-The Limits of Language

- Human beings can smell 10,000 different scents, but most of us would be hard pressed to describe any one of them without comparing it to something else, or even to itself.
- Describe the taste of cinnamon…

Flavor Profiles: Top or High Notes or First Flavors

- Top or High Notes or First Flavors
  - These flavors are the show stoppers. They fizz and zing and dance in your mouth.
  - This is the splash of citrus, the handful of fresh herbs, and the minced hot peppers.

Flavor Profiles: Middle Notes or Second Flavors

- Middle Notes or Second Flavors
  - Flavors in this range are much more subtle. They're not as immediately identifiable and don't hang around as long as the low and high notes.
  - Think raw vegetables and chicken. (And this is why those often taste bland and boring without any other flavors to fancy them up!)

Flavor Profiles: Low or Bass Notes, or Sweet, Salty, & Sour

- Low or Bass Notes, or Sweet, Salty, & Sour
  - These are the deep lingering flavors in foods that form the base or the backdrop for other flavors. Think earthy and umami.
  - These are flavors like mushrooms, seared meat, and beans.

Flavor Profiles: Aftertaste. Roundness & Depth of Flavor

- Aftertaste or Finish, often Bitterness
  - Think coffee
- Roundness, Lingering of Many Flavors
  - A better term for this might be "fullness." This is what brings all those notes together and connects them into a unified taste.
  - You don't often taste these ingredients themselves because they mostly function to bring other flavors out. It can be something mellow like butter or cream, or it can be a seasoning like salt or sugar
- Depth of Flavor, How Many Flavor Notes
  - Requires a sophisticated palate

Flavoring vs. Seasoning

- Flavoring adds a new taste to a food & alters natural flavor
- Seasoning *enhances* natural flavors, commonly salt.

Herbs and Spices

- Herb, the leaves, stems or flowers of an aromatic plant
- Spice, the bark, roots, seeds, buds or berries of aromatic plants

Salt

- Functions
  - Flavor Enhancer! (oatmeal, tomato juice)
    - Preservation (Bacon)
    - Leavening (Bread)
    - Lowering Freezing Point (Making Ice Cream)
    - Slows Down Protein Coagulation (Eggs)
    - Brining
    - Salt Crust Cooking
    - Koshering

Proper seasoning vs. saltiness

- Salt is used to enhance flavor
- Improves the transmission of taste to taste buds. (As saltwater conducts electricity better than distilled water.)

Types of Salt

- Size
  - Course (Kosher) for Savory Cooking
  - Fine or Table Salt for Baking and Final Seasoning
- Iodized vs. Non-Iodized
  - Iodine adds a metallic bitterness
  - Iodine serves only as a dietary supplement
- Sea Salts and Specialty Salts
  - Fleur de sel
  - Smoked Salts
  - For Finishing, not Cooking

Equipment: Metals

- Copper
  - Best Conductor
  - Expensive
  - Reactive-Must be Clad with Tin, Aluminum or SS
- Aluminum
  - Good Conductor
  - Inexpensive, Commonly Used
  - Reactive-CAN be Clad with SS

Equipment: Metals, con't.

- Stainless Steel
  - Poor Conductor
  - Expensive
  - Non-Reactive
- Cast Iron
  - Good Conductor, Heavy & Holds Heat
  - Inexpensive
  - Reactive-MAY be Enameled (ex. Le Creuset)
  - "Seasoning" Equipment: Metals

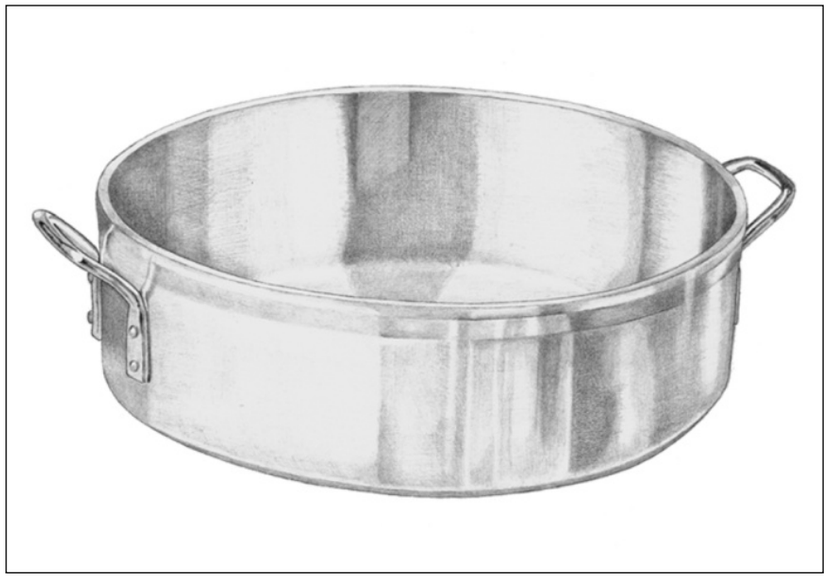
Equipment: Metals, con't.

- Cast Iron Enameled
  - Good Conductor, Heavy & Holds Heat
  - Expensive
  - Non-Reactive
- Steel
  - Woks, Crepe Pans, etc.
  - Inexpensive, Reactive (Must be "Seasoned")

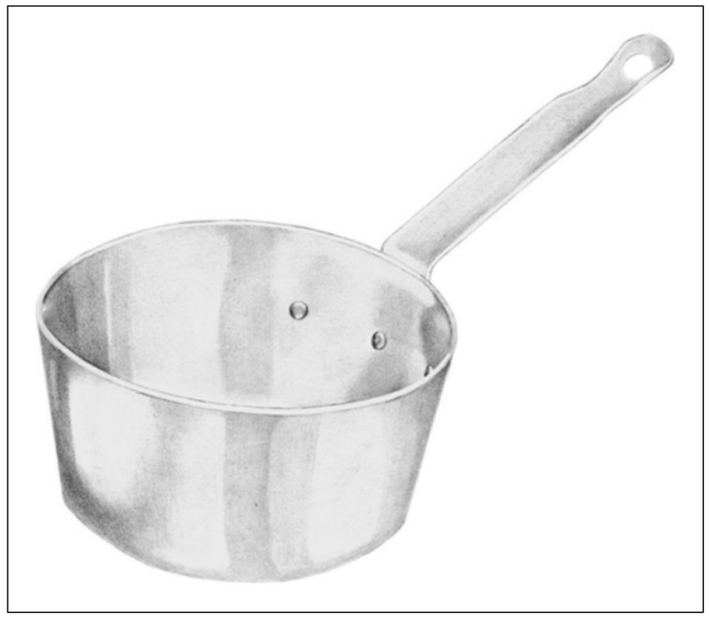
Equipment: Other Materials

- Glass
  - Poor Conductor, Holds Heat Well
  - Not Usually Used Commercially
- Plastic
  - Usually for storage or Microwave Use

Common Cookware



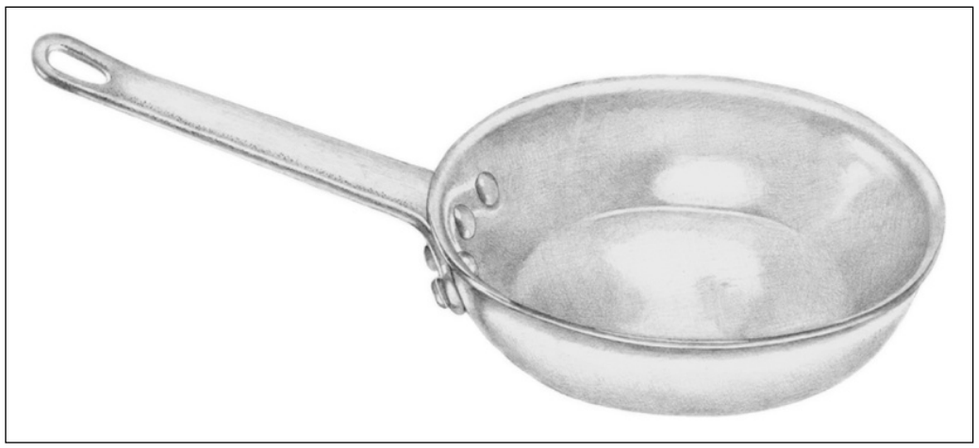
Rondeau / Brazier



Common Saucepan

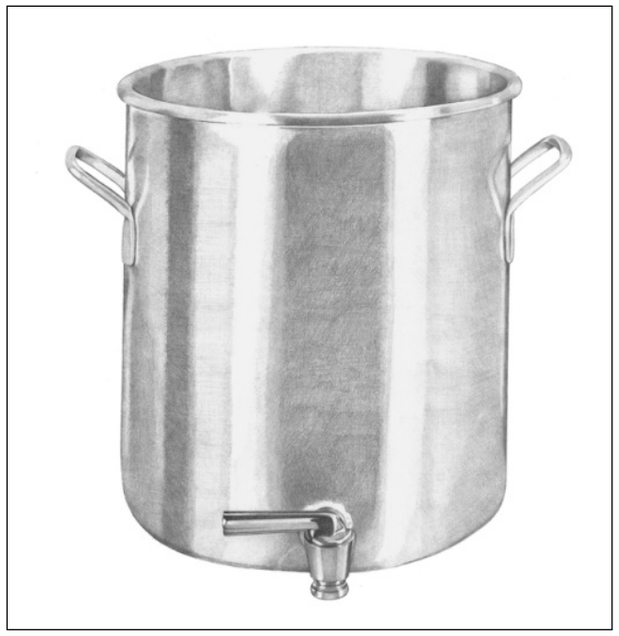
Common Cookware con't.

Sautoir (Straight Sides) or Saute Pan

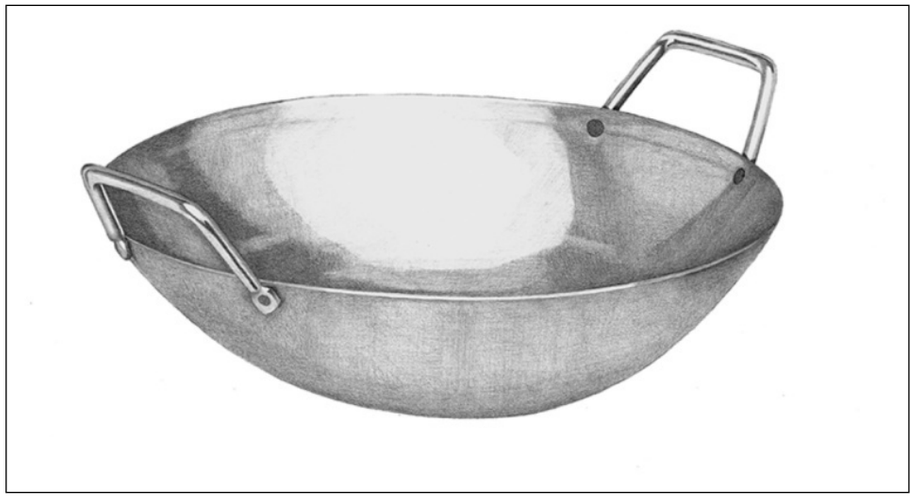


Sauteuse (Sloped Sides) or Fry Pan

Common Cookware, con't.



Stockpot with Spigot



Wok

Hotel or Steam-table Pans

Sautéing

- *LITTLE OIL-HIGH HEAT*
- French "To Jump"
- Dry Heat Method
- Used to cook foods AND
- Used to reheat par-cooked foods
- Stir-Frying is a form of Sautéing

Saute: Functions

- Cook Food
- Reheat Food
- Sear Food
- Sweat Food
- Blackening

Searing

Sweating

Blackening

Sautéing Procedure

- Prepare items to cook
- Heat the sauté pan with JUST enough fat to coat the bottom of the pan
- Add food Presentation side down first
- Turn or toss until cooked or re-warmed

Sautéing Procedure:
Use a pan with sloped sides, "Sauteuse"

Sautéing Procedure:
Heat the pan correctly…

Sautéing Procedure:
Oil the pan…

Sautéing Procedure:
Use small, evenly cut pieces of food…

Sautéing Procedure:
Mise en Place!

Sautéing Procedure:
Don’t overcrowd the pan.

Sautéing Procedure:
Listen to the sizzle.

Sautéing Procedure:
Season Starchy Vegetables at the End. Toss after Crust Forms.

Sautéing Procedure: Moist Vegetables…High Heat and Salt at End.

Sautéing Procedure: Mushrooms High Heat and Salt at Beginning.

Sautéing Procedure:
Add a little lemon juice to mushrooms.

Sautéing Procedure:
Reheating blanched vegetables…

Sautéing Procedure: Deglazing for Pan Sauces…

Sauteuse vs. Sautoir

Shallow or Pan-Frying

- Foods are usually breaded or battered
- More oil than Sauté
  - Usually up half-way the sides of the food
- Lay Food Away From You
- Presentation Side Down First
- Turn Once when GB & D
- Drain Item of Grease (On Paper or Rack)

Sauté or Pan-Frying Procedure: Proper heating of the pan…

Sauté or Pan-Frying Procedure: The water test…

Sauté or Pan-Frying Procedure: The oil…

Pan Sauces

- Made from Fond or Sucs in Pan after Sauté or Fry
- General Steps:
  - Drain Excess Fat
  - Deglaze
  - Add Aromatics
  - Stock
  - Reduce
  - Finish with Cream or Butter

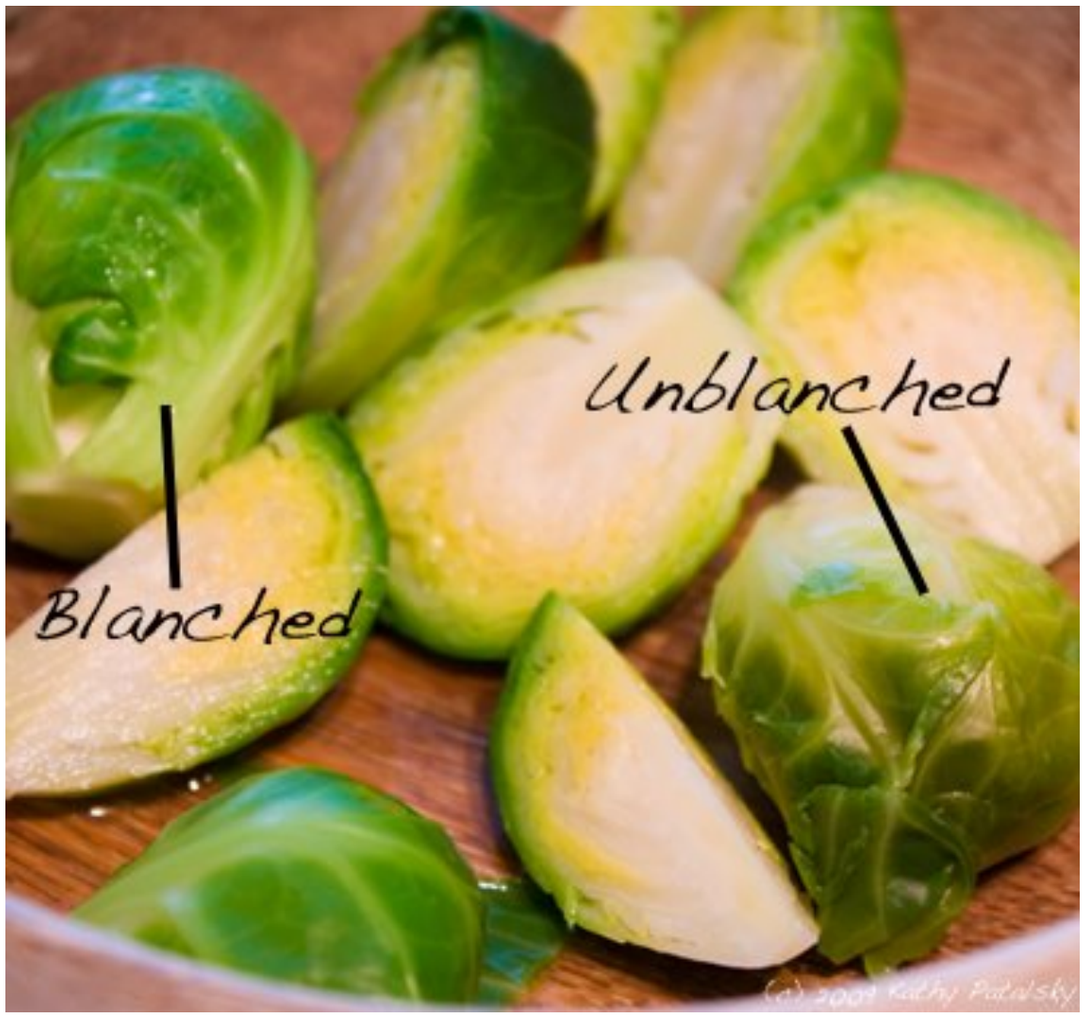
Blanching (and Shocking)

- A two-step process in which foods are plunged into boiling water, usually for only a minute or two and then put into ice water to rapidly stop the cooking process.
- This may be done oil, as in the double-fry method for making French fries

Blanching (and Shocking)

Reasons to blanch:

- to loosen thin skins from fruits and vegetables
- to brighten and fix color
- to achieve "crisp-tender" texture
- To remove bitterness from some vegetables (broccoli rabe)
- to parboil vegetables for mise en place
- to prepare fruits and vegetables for long-term freezer storage



Blanching (and Shocking)

- Blanching water should be very salty, "like the ocean."
  - Seasons and helps keep vegetables green
- Plenty of Boiling Water ("Deep Water Blanching")
  - Boiling water deactivates Chlorophyllase, which breaks down chlorophyll and turns green vegetables brown.
  - Dilutes acids released by cooking vegetables
    - (Baking soda counters the acid but turns vegetables mushy)
- Do not Cover
  - Acids released from vegetables return to the water and turn vegetables brown
- Some nutrients and flavor will leach out into the water

Sous Vide Green Vegetables

- Intensifies Flavor
- Can be Infused with other Flavors (ex. Truffle)
- Must be done quickly and at boiling temperature
- Is more energy efficient (No need for large quantities of boiling water)

Class 2 Lab

Each Student will Demonstrate to Standard:

- Proper Work-Station Set-up & Mise en Place
- Julienne
- Brunoise
- Bâtonnet
- Macédoine
- Onion, Julienned
- Potato, Diced for Skillet Potatoes
- Tomato Concassée
- Blanching and Shocking various vegetables

Each Student will Prepare to Standard *(one each)*:

- Skillet Potatoes (Diced)
- Sautéed Carrots (Bias Cut)
- Sweat an Onion (Diced)
- Sautéed Mushrooms